Data Strategies For Improved Learning

By Mike Chapman, OPI Measurement and Accountability December 10, 2001

Office of Public Instruction, Linda McCulloch, Superintendent

Some Topics for Today

- Sources of data at OPI
  - The OPI website, current and future
  - Examples of assessment data from the web
  - Requesting data from Measurement and Accountability
- Other data sources
  - The NCES website
  - US Census website

Some More Topics for Today

- Discussion of graphing techniques (brief)
- Questions and graph types
- Educational synectics

Workshop Participants Will:

- Be able to identify major topics in Bernhardt's *Data Analysis for Comprehensive School Improvement*
- Know how to order a copy of these slides from Measurement and Accountability
- Be able to find statewide assessment and other data on OPI's website

- Be forced to stay awake for at least two hours, as measured by OPI facilitators (we'll be watching…)

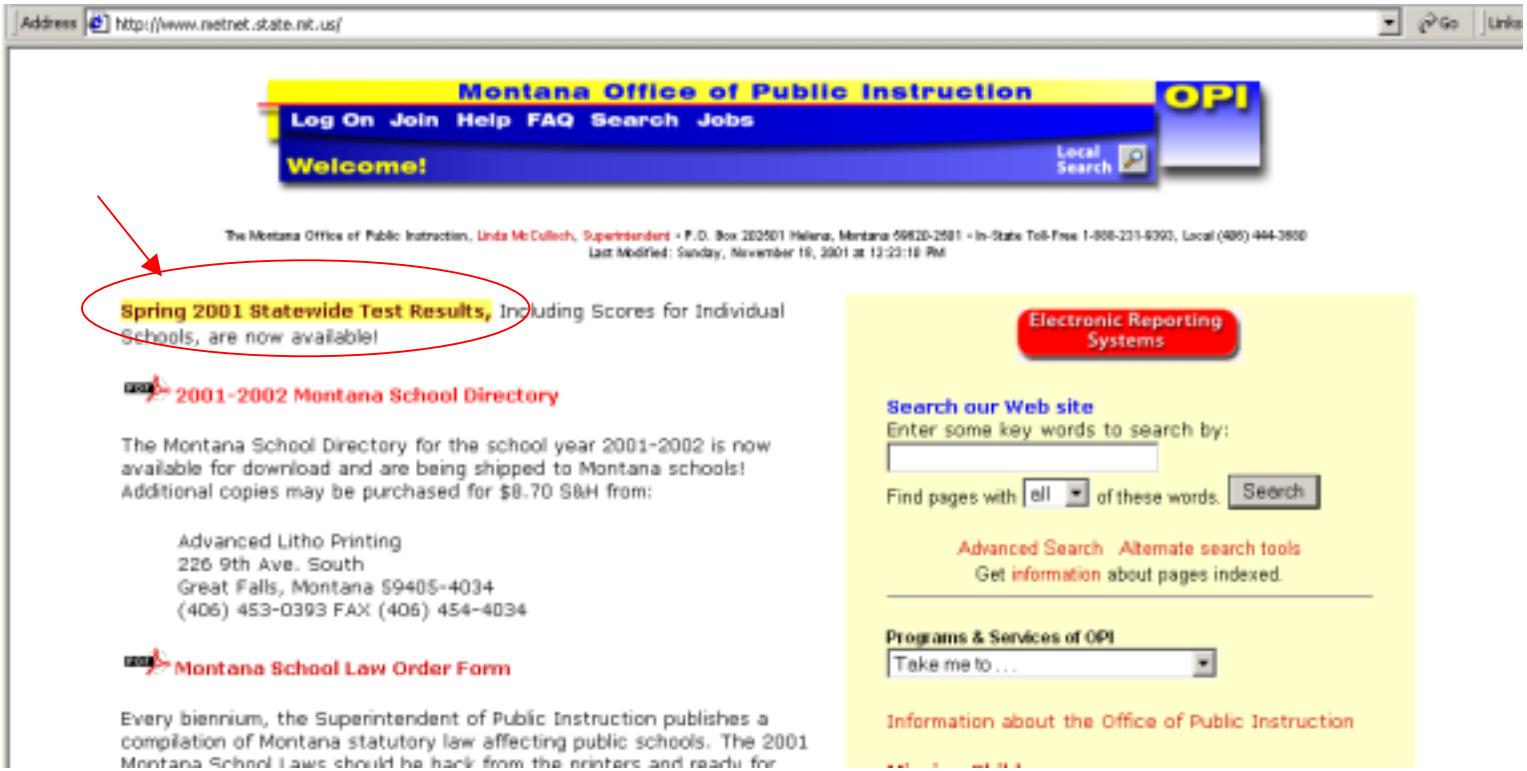
Sources of Information: OPI

- Web Resources and Publications
- Data Requests to Measurement and Accountability
- Technical Assistance
- Website enhancements

Finding the OPI Web Page

Finding the assessment data

OPI's URL (for now – soon to change): www.MetNet.mt.us



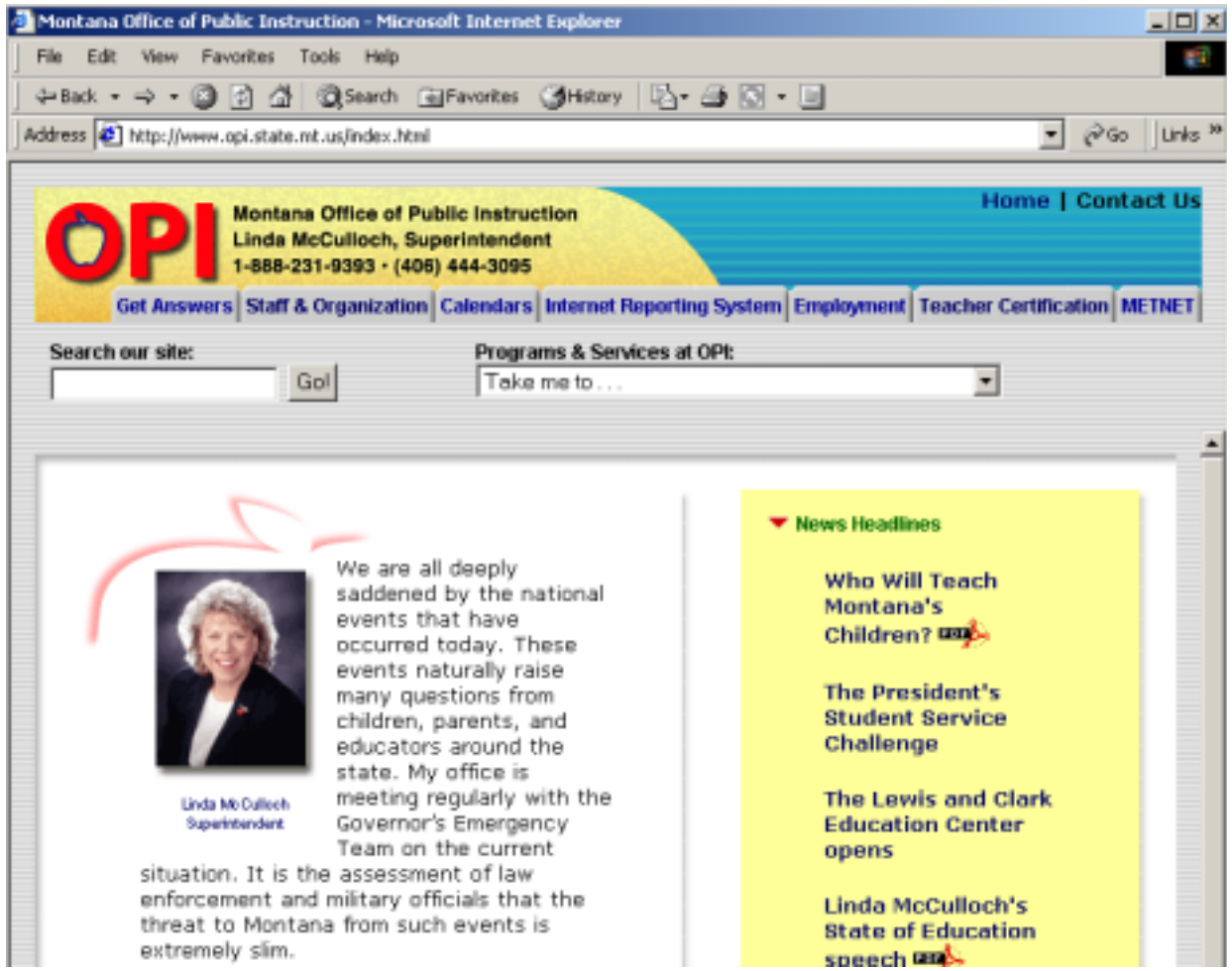
Web Resources

Finding the M&A Web Page

M&A's URL:
http://www.metnet.state.mt.us/MeasurementAcctability/htm/

Web Resources

Coming soon: a new, improved OPI website
http://www.opi.state.mt.us/index.html



Web Resources

Finding the 2001 Assessment Summary Data

Montana Comprehensive Assessment System
Phase I
Spring Administration of the Iowa Tests

NEW! Results of Spring 2001 Statewide Norm-Referenced Test

Administrative Rules of Montana Relating to Statewide Student Assessment

Authorizing Legislation for Statewide Student Assessment

- Board of Public Education
- State Superintendent of Public Instruction

Selecting this puts you into the summary data for schools and systems, rather than the breakout by racial/ethnic origin or other disaggregations.

Web Resources

Finding the 2001 Disaggregated Data - 1

make sure to click the **Enable Macros** button to run. This spreadsheet has been scanned with the latest virus definition files.

Whole State Disaggregations

Whole State Disaggregations by District Size Category

School and System Disaggregations by County

Interpretive Guide for ITBS/ITED

Selecting this puts you into the disaggregated data for schools and systems farther down the page.

Finding the 2001 Disaggregated Data - 2

These are all in Portable Document format (pdf) and contain disaggregations for all county *systems* and *schools.* They are presented by county for ease of finding a particular system or school.

County	System	School
Beaverhead	Assess2001SystemCty01.pdf	Assess2001SchoolCty01.pdf
Big Horn	Assess2001SystemCty02.pdf	Assess2001SchoolCty02.pdf
Blaine	Assess2001SystemCty03.pdf	Assess2001SchoolCty03.pdf
Broadwater	Assess2001SystemCty04.pdf	Assess2001SchoolCty04.pdf
Carbon	Assess2001SystemCty05.pdf	Assess2001SchoolCty05.pdf

A whole-page (unreadable) view of one school's disaggregated data

Montana Norm-referenced Statewide Assessment 2000-2001

School system: 0221 Chinook Public Schools **County:** 03 Blaine CO: 03 LE: 0028

Montana Norm-referenced StatewideAssessment School Year 2000-2001 By School

Grades 4 and 8, ITBS, Form A -- Grade 11, ITED, Form A

School: 1798 Chinook 7-8

Grade	Subject Area	Grouping		Count of students in performance category: Total	Novice	Nearing	Proficient	Advanced	Percent of students in performance category: Novice	Nearing	Proficient	Advanced	NCE	NPR
Disaggregation: All Students Combined														
0008	READING		RD	30	3	6	17	4	10%	20%	57%	13%	55	60
0008	MATH		MA	30	3	6	18	3	10%	20%	60%	10%	52	54
0008	LANGUAGE ARTS		LA	30	4	6	16	4	13%	20%	53%	13%	52	54
0008	SCIENCE		SC	30	3	2	18	7	10%	7%	60%	23%	58	64
0008	SOCIAL STUDIES		SS	30	5	4	16	5	17%	13%	53%	17%	58	65
Disaggregation: Students Without Disabilities														
0008	READING		RD	26	1	5	16	4	4%	19%	62%	15%	59	66
0008	MATH		MA	26	1	4	18	3	4%	15%	69%	12%	55	59
0008	LANGUAGE ARTS		LA	26	2	4	16	4	8%	15%	62%	15%	54	58
0008	SCIENCE		SC	26	2	2	15	7	8%	8%	58%	27%	60	68
0008	SOCIAL STUDIES		SS	26	4	4	13	5	15%	15%	50%	19%	59	67
Disaggregation: Students With Disabilities														
0008	READING		RD	4	*	*	*	*	*	*	*	*	*	*
0008	MATH		MA	4	*	*	*	*	*	*	*	*	*	*
0008	LANGUAGE ARTS		LA	4	*	*	*	*	*	*	*	*	*	*
0008	SCIENCE		SC	4	*	*	*	*	*	*	*	*	*	*
0008	SOCIAL STUDIES		SS	4	*	*	*	*	*	*	*	*	*	*
Disaggregation: Gender														
0008	READING	F	RD	15	1	2	8	4	7%	13%	53%	27%	62	72
0008	READING	M	RD	15	2	4	9	0	13%	27%	60%	0%	51	51
0008	MATH	F	MA	15	0	2	10	3	0%	13%	67%	20%	60	68
0008	MATH	M	MA	15	3	4	8	0	20%	27%	53%	0%	44	39

Printed: Friday, November 02, 2001 * Results not shown to protect student privacy Report: rptSchoolDisaggregations *Page 1 of 56*

Note 1: Testing data for school year 2000-2001 establishes a new baseline for Montana assessment, reporting the results of a new test (ITBS/ITED Form A, normed against a national sample population in school year 2000) administered uniformly across the state for the first time. These test scores therefore cannot be compared to results from prior years in a statistically valid way.

Note 2: The absence of one or more disaggregation category, such as Students With Disabilities, means that no students were tested who belonged to that category.

Web Resources

A closer view of some salient detail

Montana Norm-referenced Statewide Assessment 2000-2001 ***Count of stude***

Grade	*Subject Area*	*Grouping*	*Total*	*Novice*
School system: 0221 Chinook Public Schools			***County:*** 03	Blaine
Grade	*Subject Area*	*Grouping*		
Disaggregation: All Students Combined				
0008	READING		RD	
0008	MATH		MA	
0008	LANGUAGE ARTS		LA	
Disaggregation: Racial/Ethnic Origin				
0008	READING	American Indian/Alaskan Native	RD	
0008	READING	Hispanic or Latino	RD	
0008	READING	White, Non-Hispanic	RD	
0008	MATH	American Indian/Alaskan Native	MA	
0008	MATH	Hispanic or Latino	MA	
0008	MATH	White, Non-Hispanic	MA	

Etc…

Web Resources

More salient detail

Percent of students in performance category			
Novice	*Nearing*	*Proficient*	*Advanced*
10%	20%	57%	13%
10%	20%	60%	10%
13%	20%	53%	13%
10%	7%	60%	23%
17%	13%	53%	17%

NCE	NPR
55	60
52	54
52	54
58	64
58	65

Data Requests to Measurement and Accountability

- Provide ad hoc data for specific needs, e.g., grant proposals, OPI or other state agency needs
- Number over 100 per year
- Normally require over two hours to produce

Data Requests to Measurement and Accountability – Data Formats

- MS Access 2000, also 97
- MS Excel
- Text
- HTML

Data Requests to Measurement and Accountability - Considerations

- We prefer e-mail to open the discussion to create an e-paper e-trail (e-gad!).
- Please include a phone number, since many requests require clarification.
- Please exhaust your local resources before calling.
- Please give us as much lead time as possible.

Measurement and Accountability Staff Members

- Mike Chapman, 444-4527, Rsch & Analysis Mgr mchapman@state.mt.us
- Vicki Thacker, 444-6712, Data Specialist, vthacker@state.mt.us
- To Be Hired (Soon, we hope)
- Lindy Miller, 444-6774, Administrative Assistant, lindmiller@state.mt.us

Technical Assistance From Measurement and Accountability

- Limited due to staff workloads
- Nuts and bolts, rather than policy-oriented

Still to Come:
Disaggregated Data in Excel

- Two types of assessment data, SUMMARY and DISAGGREGATED.
- Summary spreadsheets have 1,000 rows for school-level and 700 for system-level data.
- Disaggregated Access tables have 38,000 rows for school-level and 31,000 for system-level data.

New data on the web

Still to Come: Disaggregated Data in Excel

- Any grouping with less than 6 students can't be published for reasons of student privacy (just like the disaggregated pdf reports).
- We will probably publish school-level and system-level data by county, just like the pdf reports, and as soon as practicable.

Sources of Information: NCES http://nces.ed.gov/

NCES website

From the Encyclopedia of Ed Stats:

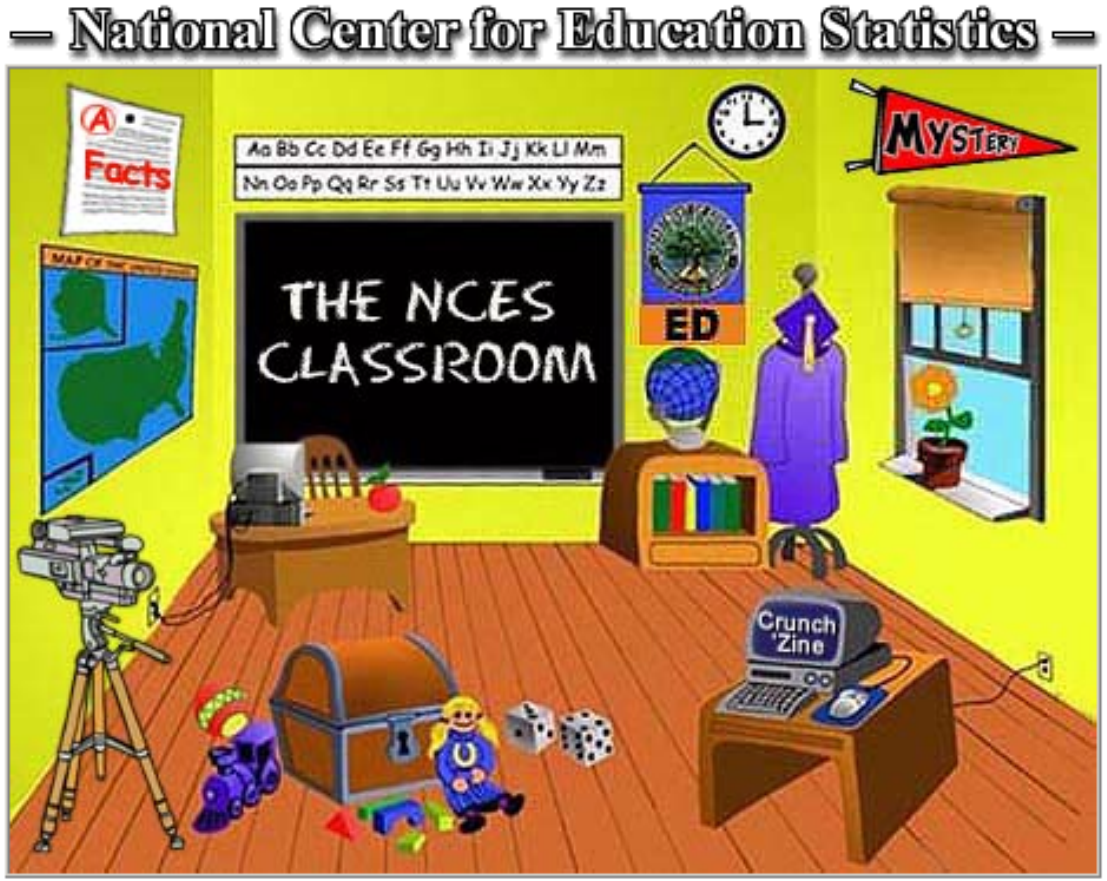
All of the 13 states in the West are expected to show increases in public school enrollment between 1999 and 2010. Increases are expected in Alaska (12 percent), Arizona (12 percent), California (5 percent), Colorado (6 percent), Hawaii (12 percent), Idaho (16 percent), Montana (3 percent), Nevada (15 percent), New Mexico (14 percent), Oregon (1 percent), Utah (8 percent), Washington (3 percent), and Wyoming (8 percent).

NCES website

Sources of Information: NCES http://nces.ed.gov/

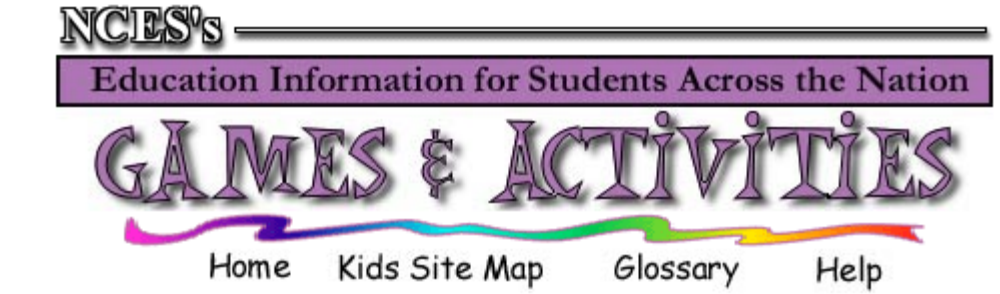
NCES website

The NCES Student's Classroom



NCES website

One of the interactive features of the Student's Classroom



NCES website

One of the interactive features of the Student's Classroom

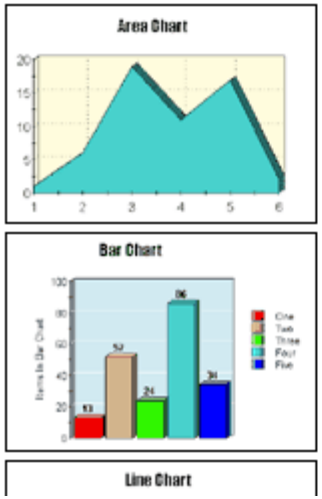
NCES's

Education Information for Students Across the Nation

Create a Graph

Home Kids Site Map Glossary Help

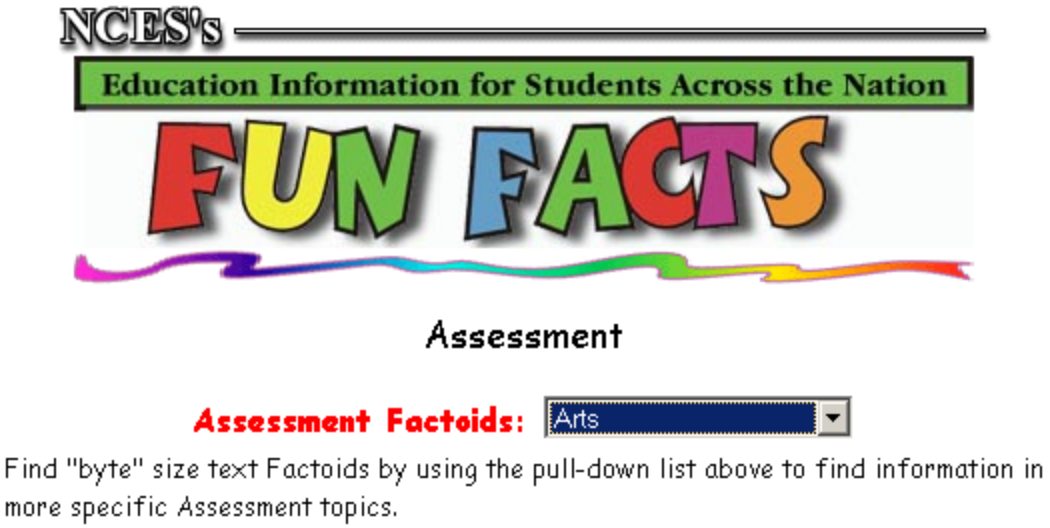
Have you heard the saying: "A picture is worth a thousand words"?



Graphs and charts are great because they communicate information visually. For this reason, graphs are often used in newspapers, magazines and businesses around the world. NCES constantly uses graphs and charts in our publications and on the web. Sometimes, complicated information is difficult to understand and needs an illustration. Other times, a graph or chart helps impress people by getting your point across quickly and visually. Here you will find four different graphs and charts for you to consider. Maybe it will help explain what you are trying to show. Use homework problems, things you have a special interest in, or use some of the numbers you find elsewhere on this site. Have fun!

NCES website

From the Student's Classroom – Fun Facts

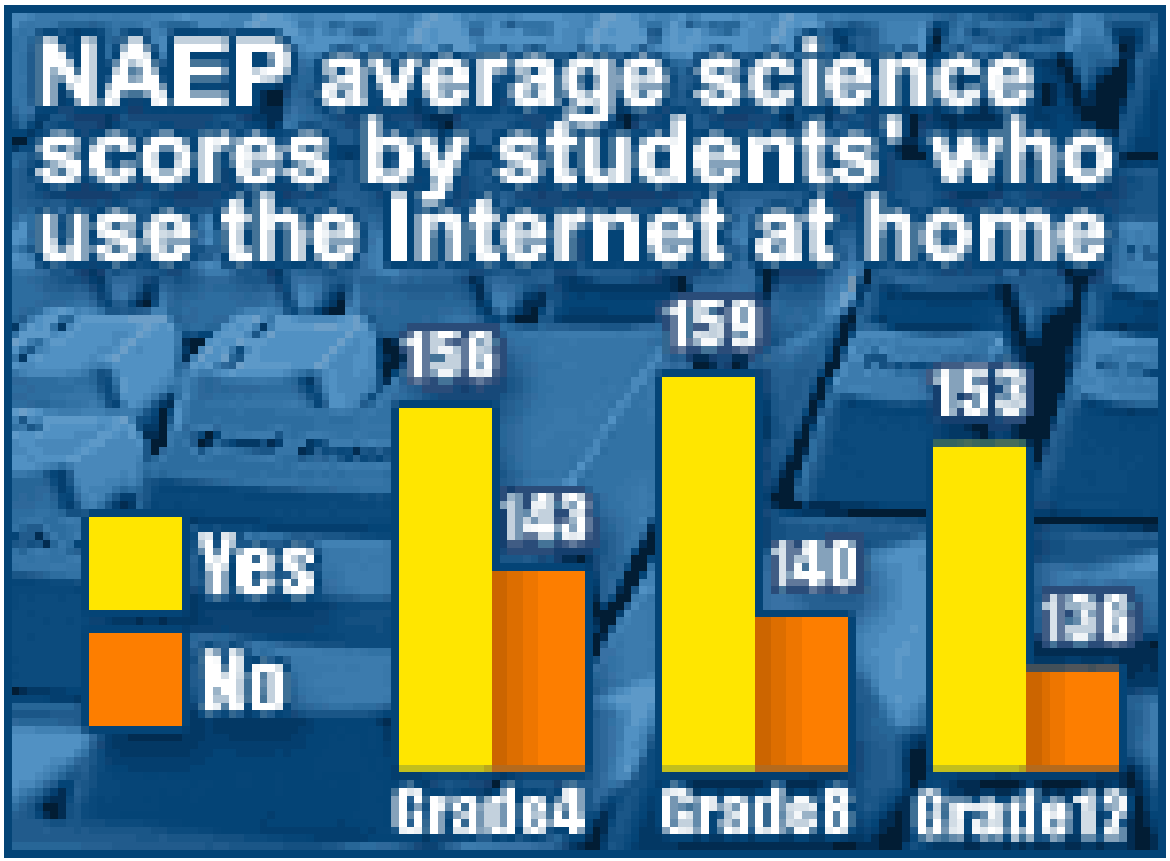


NCES website

A Fun Fact: TV Watching And Achievement

NCES website

A Fun Fact: Internet Use and Science Scores



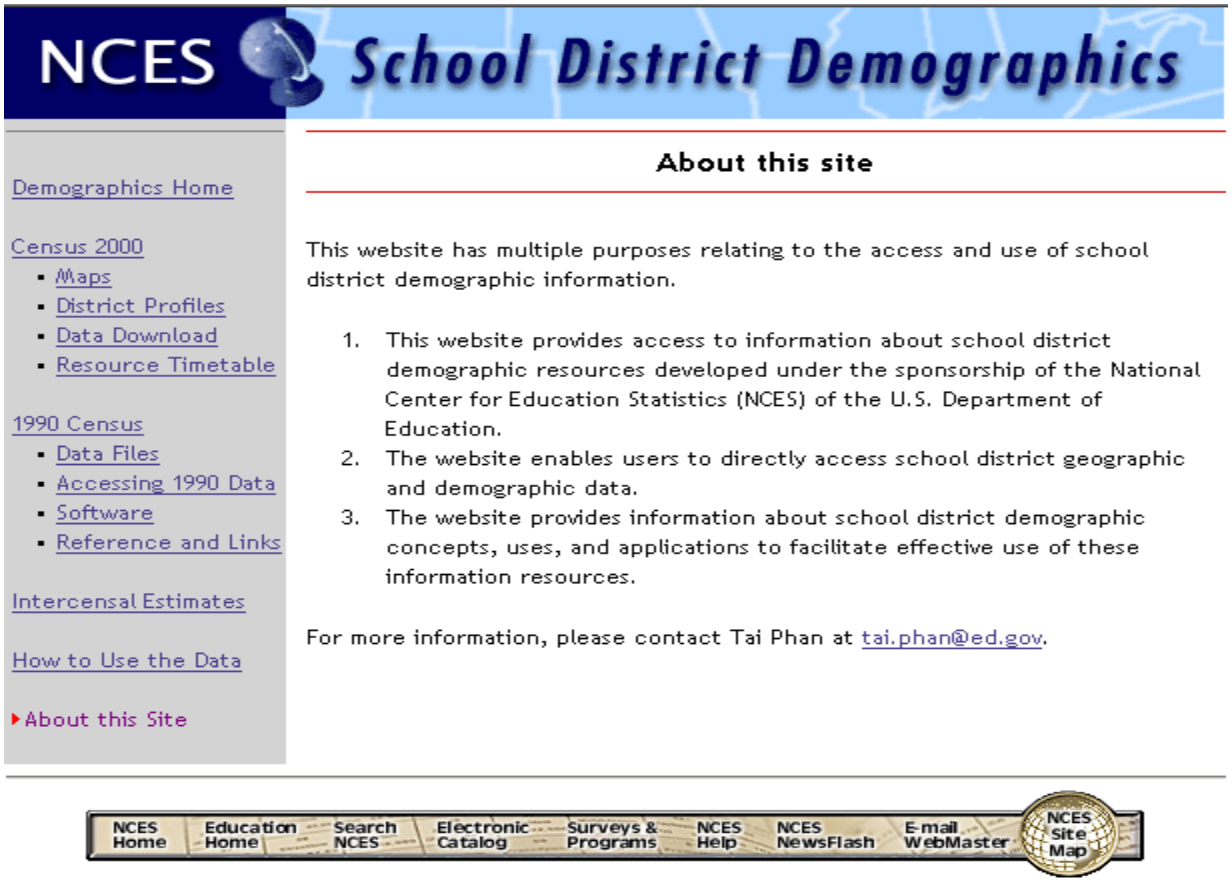
NCES website

Sources of Information: NCES http://nces.ed.gov/

NCES website

New NCES Site: Demographics

http://nces.ed.gov/surveys/sdds/



NCES website

To get on the NCES eMailing list, go to:

http://nces.ed.gov/newsflash

Some Notes on Creating Graphs

Graphs and graphing

Different Graph Types Answer Different Questions

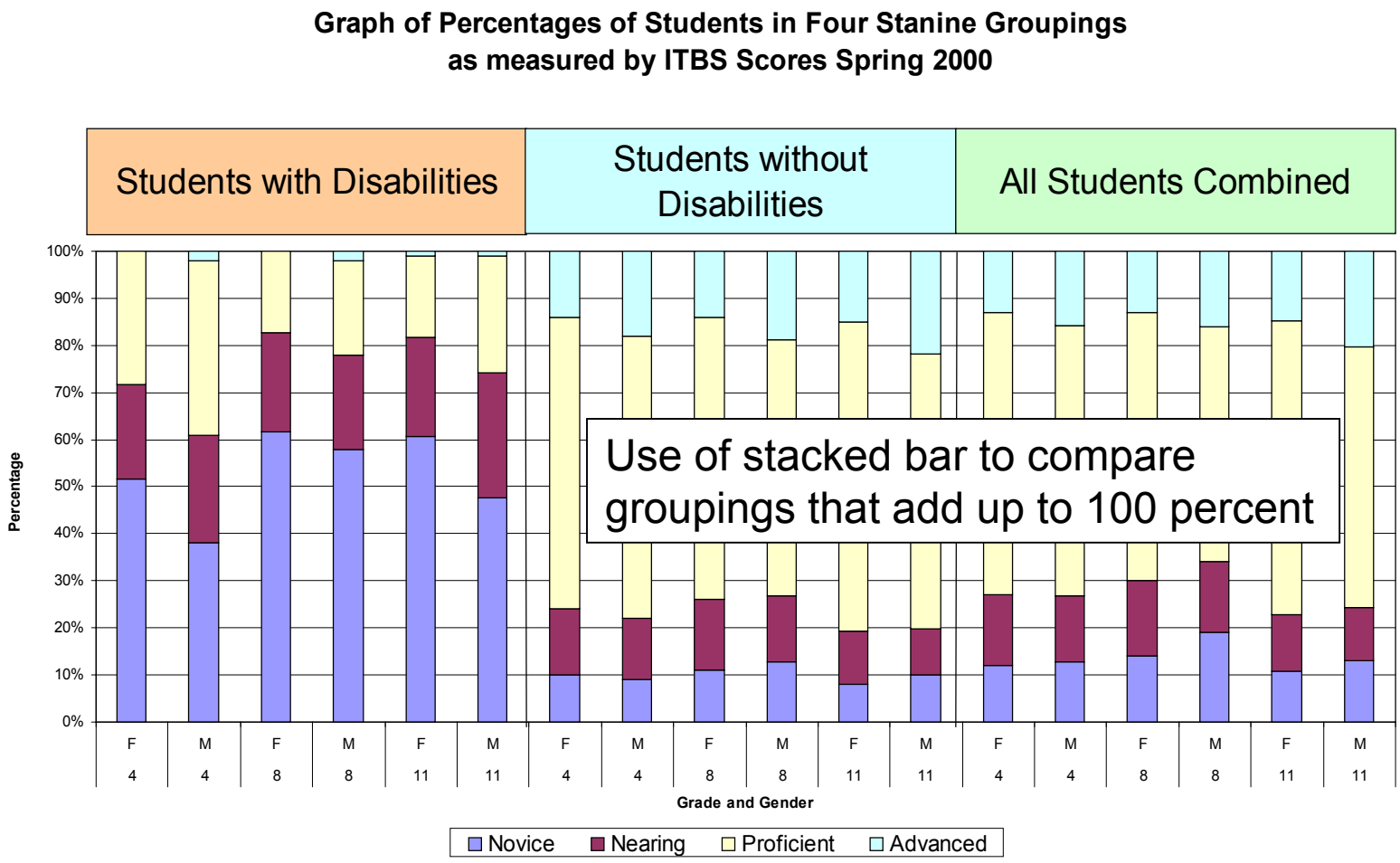
- Pie or stacked bar chart for percentages or parts of wholes
  (Bernhardt, p 37)
- Bar graph for relative magnitudes, e.g., numbers of students in groups
- X-Y graph to show interaction of two variables
  (Bernhardt, Ch 5)
- Flow charts to map processes
  (Bernhardt, p 103)

Graphing Disaggregated Data: Using Two Columns to Label the X-axis in Excel - 1

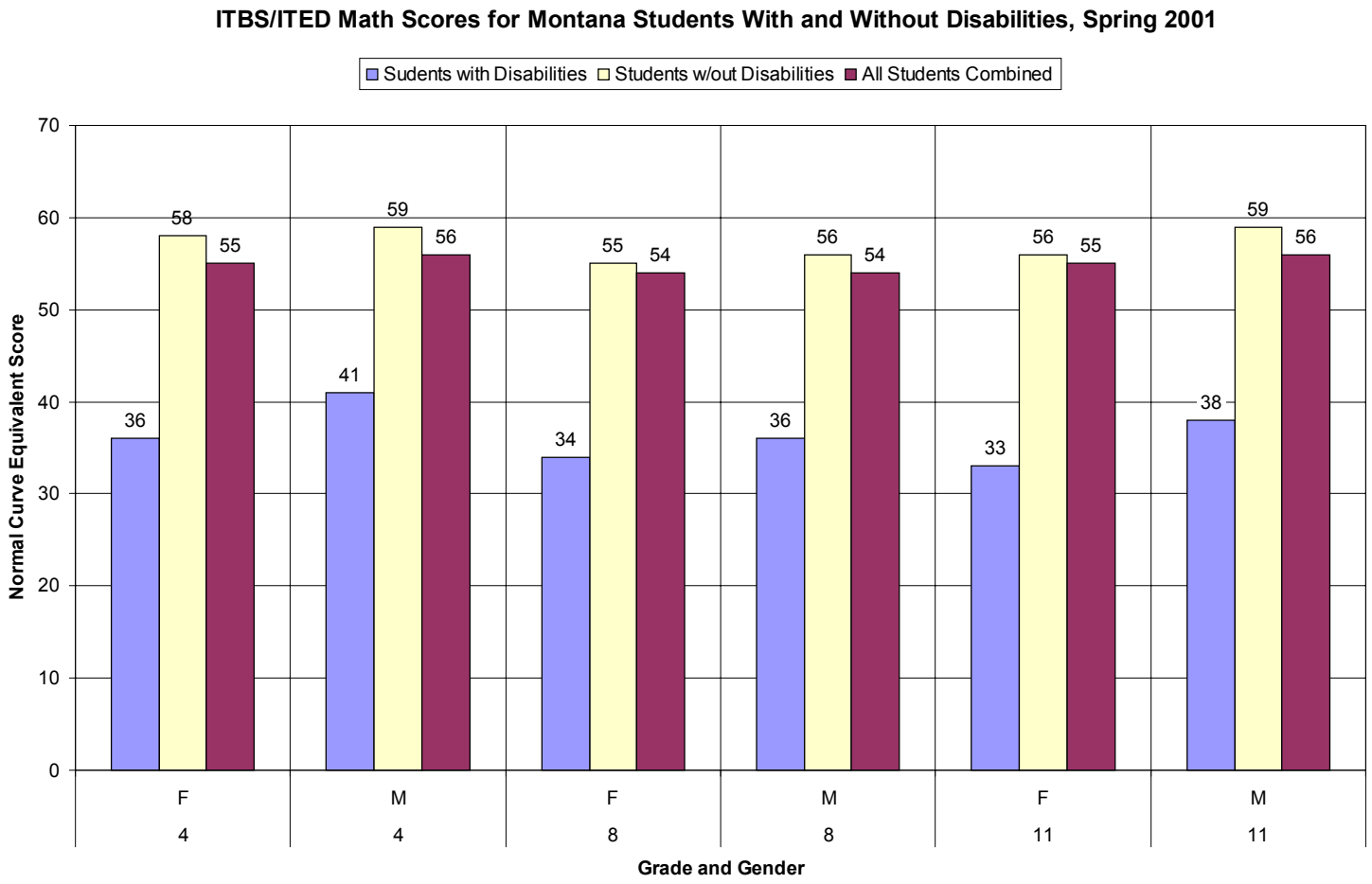
Select both of these columns for X-axis label to get the result shown on the next slide.

SubjectArea	ClassGrade	Gender	NceAvg
MATH	4	F	36
MATH	4	M	41
MATH	8	F	34
MATH	8	M	36
MATH	11	F	33
MATH	11	M	38
MATH	4	F	58
MATH	4	M	59
MATH	8	F	55
MATH	8	M	56
MATH	11	F	56
MATH	11	M	59

Using Two Columns to Label the X-axis in Excel - 2

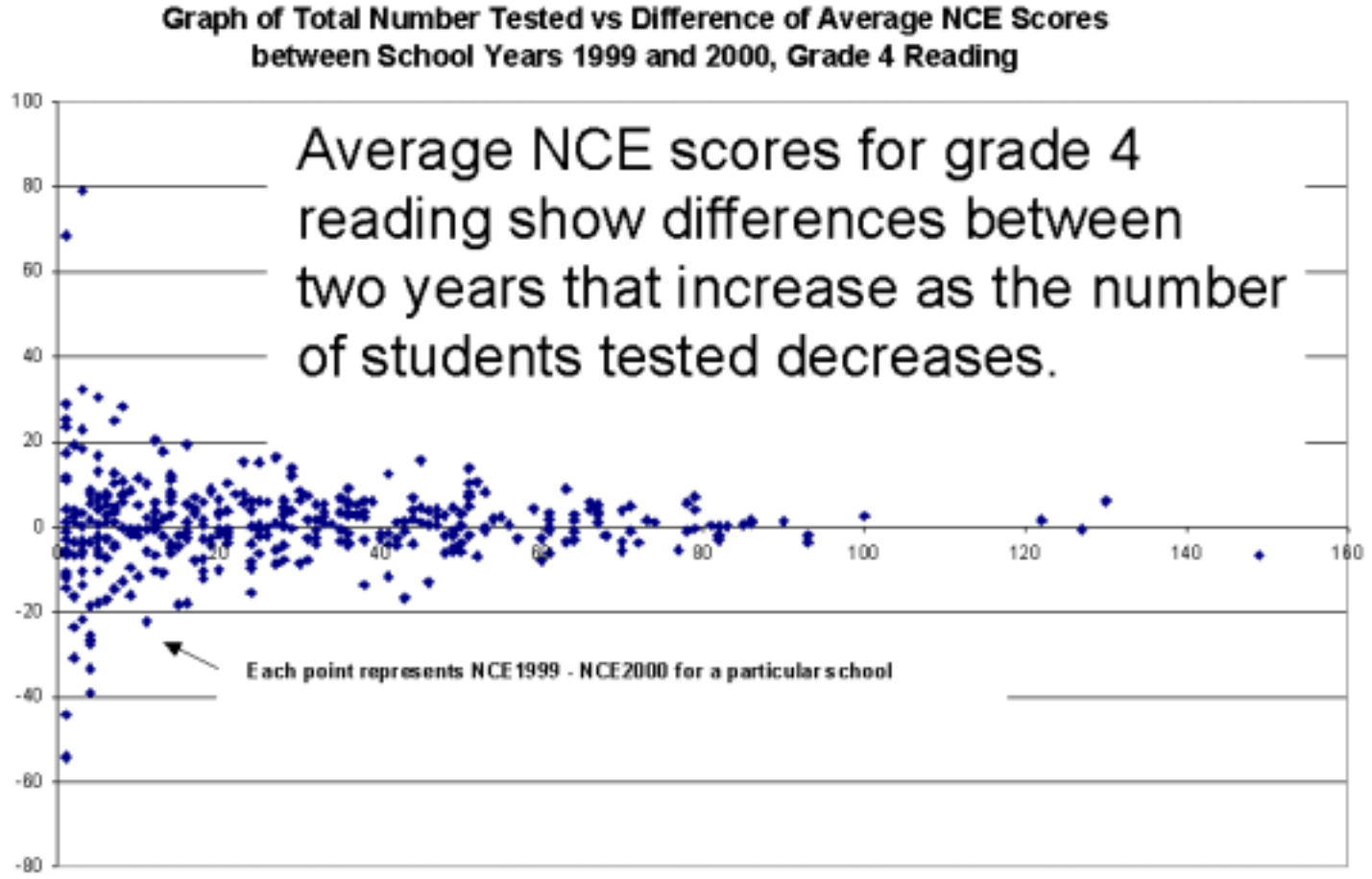


A Bar Chart for Count Comparison



Graphs and graphing

Using an X-Y Graph Type



Source: tblMaAssmtCombinedNcePre2001Norm

12/6/2001

Statewide Assessment Scoring Definitions and Characteristics

Source: OPI website -- *ITBS/MontCAS Interpretive Guide*

Graphs and graphing

Statewide Assessment Scoring Definitions and Characteristics

Raw Score

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
Raw Score (RS)	Number of test questions student answered correctly.	Number of items varies per test.	Can be used to calculate percent-correct.	Can be converted to other scores: SS, NS, NCE, NPR.	If Jesse's raw score on a 40-item test is 30, he answered 30 of the 40 items correctly.	Meaning varies from test to test.

Source: *ITBS/MontCAS Interpretive Guide*

Statewide Assessment Scoring Definitions and Characteristics

Standard Score

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
Standard Score (SS)	Equal-interval scale of scores that is continuous from kinder-garten to grade 12.	80–400	• Shows year-to-year growth. • Median SS for each grade reflects typical student performance in that grade.	To measure achievement growth from year to year.	Sam is in eighth grade. His Reading Comprehension SS of 249 means that his reading level is like that of the typical eighth-grade student in March.	For interpretation of the SS, a benchmark value associated with typical performance in each grade is needed.

Source: *ITBS/MontCAS Interpretive Guide*

Statewide Assessment Scoring Definitions and Characteristics

National Percentile Rank

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
National Percentile Rank (NPR)	Percent of students in the national norm group who earned raw scores the same as or lower than a particular raw score.	1–99	• Shows a student's relative positioning in a group of students in the same grade tested at the same time of year. • Frequency-based scale.	• To describe student performance in small, fairly precise units relative to the norm group. • To describe areas of relative strength and weakness for an individual student, class, or grade group.	Lisa's NPR of 43 for Social Studies means that 43 percent of the national norm group scored at or below Lisa's raw score, and 57 percent scored higher.	NPRs cannot be averaged. Group averages must be reported in terms of other scores, such as the NPR of the average SS.

Source: *ITBS/MontCAS Interpretive Guide*

Graphs and graphing

Statewide Assessment Scoring Definitions and Characteristics

National Stanine

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
National Stanine (NS)	A grouping of percentile ranks.	1–9	• A stanine of 5 is average; stanines 1–4 are below average; 6–9 are above average. • Equal-interval scale.	To broadly identify areas of strength and weakness.	Lara's stanine of 3 for Reading Total means that she is in the below average stanine group.	Less precise than percentile ranks.

Source: *ITBS/MontCAS Interpretive Guide*

Statewide Assessment Scoring Definitions and Characteristics

Normal Curve Equivalent

NRT Scores	Definition	Score Range	Characteristics	Uses	Example	Limitations
Normal Curve Equivalent (NCE)	Equal-interval scores that result from dividing the normal curve into 99 equal units.	1–99	• Equal-interval score. • Scores can be added, subtracted, and averaged.	• To compare tests in terms of strengths and weaknesses. • To compare groups of students.	If Tanya's Reading Total NCE is 46 and her Math Total is 58, you can say that she has a relative weakness in reading and a relative strength in math.	NCEs from different test batteries (*e.g.*, the *SAT 9* and the *ITBS*) cannot be interchanged.

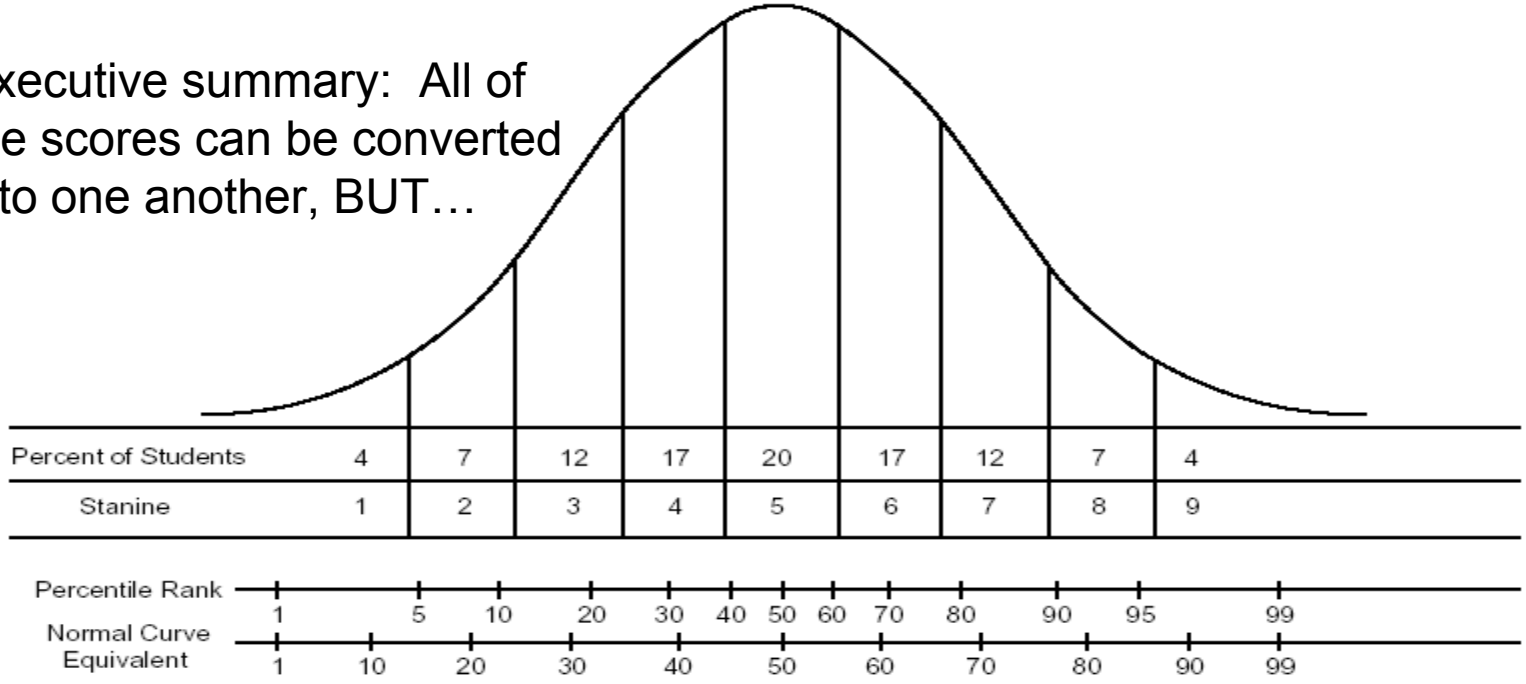
Source: *ITBS/MontCAS Interpretive Guide*

Graphs and graphing

Comparison of Bell Curve Axes

Relationship of Stanines, Percentile Ranks, and Normal Curve Equivalents

Executive summary: All of the scores can be converted into one another, BUT…



…the STANDARD SCORE is the basis of all of them.

Source: *ITBS/MontCAS Interpretive Guide*

Graphs and graphing

Book Report:
Data Analysis for Comprehensive School Improvement
by Victoria Bernhardt

Major themes in *Data Analysis*

Some Useful Pages

- 11 – Getting started questions
- 15 – The Most Famous Graph in the World
- 26 – Demographic data elements
- 45 – Perception data chart
- 66 – The Normal Curve and its many axes
- 70 – Score conversion tables
- 103 – Learning process flow chart
- 126 – Interactions among data sets

Some Useful Pages

- 144 – Problem-solving cycle diagram
- 149 – Cause and effect brainstorming diagram
- 182 ff. – Chart types for reporting data
- 236 – Questionnaire design flowchart
- 244 – Data collection decision tree
- 277 ff. – Continuous Improvement Continuums

Your Turn:

In five minutes or less, describe a problem in your school you have solved by using information derived from data you collect.

Educational Synectics:

How is School Improvement like the Scientific Revolution?

How is School Improvement like the Scientific Revolution?

- It's a definite break from tradition.
- Uses observation and measurement to find optimum solutions to problems.
- Relies on evidence instead of assumptions.
- Builds a web of interrelated facts into a coherent and testable model of learning.
- It requires the combined efforts of many thoughtful and dedicated people.

How is School Improvement like the Scientific Revolution?

- It paints a radically different view of its environment.
- It can arouse resistance in the old-line "true believers."
- It proceeds from hypothesis to testing to revision to retesting, and so on.
- Literally, *it is the scientific method in action* to give us a better understanding of our world and a chance to make a better world.